



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/410,646	10/01/1999	DAVID A. EDWARDS	99-TK-262	7191

7590 11/27/2006

LISA K JORGENSEN
STMICROELECTRONICS INC
1310 ELECTRONICS DRIVE
MAIL STOP 2346
CARROLLTON, TX 75006

EXAMINER

MASKULINSKI, MICHAEL C

ART UNIT	PAPER NUMBER
----------	--------------

2113

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/410,646

Applicant(s)

EDWARDS ET AL.

Examiner

Michael C. Maskulinski

Art Unit

2113

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Non-Final Office Action

Double Patenting

1. The Examiner maintains that claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 5 of co-pending Application No. 09/410,642. The body of the rejection can be found in the first Office Action, mailed May 7, 2002.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 3, 7-9, 11-14, 16, and 18-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolff et al., U.S. Patent 4,486,826.

Referring to claims 1, 16, 25:

a. In column 3, lines 61-64, Wolff et al. disclose that the A and B buses each carry an address (packet routing information).

b. In column 3, lines 61-64, Wolff et al. disclose that the A and B buses each carry an identical set of cycle definition, address, data, parity and other signals that can be compared to warn of erroneous information transfer between units (packets of information, wherein each packet comprises a number of fields containing information). Further, in column 19, lines 45-49, Wolff et al. disclose a bus protocol for transmitting data on the bus. Therefore the packets of information of Wolff et al. are protocol-defined.

- c. In column 14, lines 7-8, Wolff et al. disclose that each data transfer cycle has at least four such timing phases. Further, in column 14, lines 28-68 continued in column 15, lines 1-45, Wolff et al. disclose a definition phase containing address information and a response phase containing data. By definition a packet is a group of bits that perform a function. In Wolff et al. a cycle is a group of bits with different phases that perform a single function. Therefore, Wolff et al. teach a packet containing information including both data and packet routing information. Further, in column 14, lines 45-58, Wolff et al. teach that each module has a unique identification on the interconnect and wherein the routing information identifies at least one of the modules associated with the data.
- d. In column 2, lines 31-35, Wolff et al. disclose a computer system, which has a processor module with a processing unit, a random access memory unit, and peripheral control units (plurality of modules), and it has a single bus structure which provides all information transfers between the several units of the module.
- e. In column 2, lines 48-56, Wolff et al. disclose that the computer system provides fault detection at the level of each functional unit within a processor module. To attain this feature, error detectors monitor hardware operations within each unit and check information transfers between the units (circuitry for determining if the information satisfies one or more conditions).

f. In column 2, lines 48-56, Wolff et al. disclose that the detection of an error causes the processor module to isolate the bus or unit which caused the error from transferring information to other units (circuitry for preventing a module from putting further information onto said interconnect in response to the determination that the information satisfies one or more conditions).

Referring to claim 3, in column 3, lines 57-68, Wolff et al. disclose that the bus carries cycle-definition, address (address of the information), data, parity, and other signals that can be compared to warn of erroneous information transfer between units (match conditions). Requests and responses are inherent to the information mentioned above because an address is sent to a device to request data and in response the data is sent.

Referring to claim 7, in column 2, lines 48-56, Wolff et al. disclose that the detection of an error causes the processor module to isolate the bus or unit which caused the error from transferring information to other units (prevent one or more modules from being granted access to the interconnect). Further, in column 40, lines 63-68 continued in column 41, lines 1-2, Wolff et al. disclose a broken flip-flop (preventing circuitry) to disable the drivers of a peripheral device in response to a fault.

Referring to claim 8, in column 40, lines 56-68 continued in column 41, lines 1-2, Wolff et al. disclose a comparator that compares peripheral (module) output signals (information on interconnect) with corresponding output signals from the check control section (match conditions). In response to an invalid comparison, the comparator

Art Unit: 2113

switches a so-called broken flip-flop to disable the drivers (determining circuitry using a comparator).

Referring to claims 9 and 11, in column 25, lines 32-40, Wolff et al. disclose that the central processing unit (circuit) has two subsystems and control circuits within the unit that take the unit off-line upon detection of an error (precondition: enabled or not enabled). Further, in column 40, lines 56-68 continued in column 41, lines 1-2, Wolff et al. disclose a comparator that compares peripheral (module) output signals (information on interconnect) with corresponding output signals from the check control section (match conditions). In response to an invalid comparison, the comparator switches a so-called broken flip-flop to disable the drivers (preventing circuitry).

Referring to claims 12 and 13, in figures 5A, 5B, and 1, and in column 28, lines 21-35, Wolff et al. disclose latch 120 which is between the interconnect and the processor module (circuitry external to said circuit). The latch provides temporary storage of output data so that in the event any error is reported on the buses, the operating sequence in which the error was reported can be duplicated and the data retransmitted on the A bus 42 (external circuitry is enabled).

Referring to claim 14, in column 3, lines 57-68, Wolff et al. disclose that the bus carries cycle-definition (type of transaction to which the information relates), address (address of the information), data, parity, and other signals that can be compared to warn of erroneous information transfer between units (match conditions). The information comprising packets of information, requests, and response is inherent to the information mentioned above that is sent over a bus.

Art Unit: 2113

Referring to claim 18, in column 20, lines 35-55, Wolff et al. disclose an arbitration network (arbiter) which provides an automatic hardware determination of which unit, or pair of partner units, that requests access to the bus structure (interconnect) has priority to initiate an operating cycle (granted access). In column 3, lines 34-47, Wolff et al. disclose that upon detection of an error-manifesting fault in any unit, that unit is isolated and placed off-line so that it cannot transfer information to other units of the module (preventing circuitry). As stated above upon detection of an error in a unit, that unit is isolated and taken off-line, therefore, the unit cannot participate in the arbitration (module prevented from putting information onto the interconnect is prevented from winning an arbitration).

Referring to claim 19, in column 20, lines 35-55, Wolff et al. disclose that the processor module (determining circuitry) has two arbitration networks (arbiter) connected to bus A and bus B.

Referring to claim 20, in the abstract, Wolff et al. disclose a bus.

Referring to claims 21, 22, and 23, in column 2, lines 48-63, Wolff et al. disclose error detectors (debug module) at the level of each functional unit (module). Further, in column 40, lines 63-68 continued in column 41, lines 1-2, Wolff et al. disclose a comparator, which switches a so-called broken flip-flop to disable the drivers upon detection of an error (preventing circuitry). The comparator is part of the control unit, which is part of the functional unit (determining circuitry in said debug module).

Referring to claim 24:

- a. In column 3, lines 61-64, Wolff et al. disclose that the A and B buses each carry an address (packet routing information).
- b. In column 2, lines 31-35, Wolff et al. disclose a computer system, which has a processor module with a processing unit, a random access memory unit, and peripheral control units (plurality of modules), and it has a single bus structure (interconnect) which provides all information transfers between the several units of the module.
- c. In column 3, lines 61-64, Wolff et al. disclose that the A and B buses each carry an identical set of cycle definition, address, data, parity and other signals that can be compared to warn of erroneous information transfer between units (packets of information, wherein each packet comprises a number of fields containing information). Further, in column 19, lines 45-49, Wolff et al. disclose a bus protocol for transmitting data on the bus. Therefore the packets of information of Wolff et al. are protocol-defined.
- d. In column 2, lines 48-56, Wolff et al. disclose that the detection of an error causes the processor module to isolate the bus or unit which caused the error from transferring information to other units (circuitry for preventing a module from putting further information onto said interconnect).
- e. In column 20, lines 35-55, Wolff et al. disclose an arbitration network (arbiter) which provides an automatic hardware determination of which unit, or pair of partner units, that requests access to the bus structure (interconnect) has priority to initiate an operating cycle (granted access). In column 3, lines 34-47,

Art Unit: 2113

Wolff et al. disclose that upon detection of an error-manifesting fault in any unit, that unit is isolated and placed off-line so that it cannot transfer information to other units of the module (preventing circuitry). As stated above upon detection of an error in a unit, that unit is isolated and taken off-line, therefore, the unit cannot participate in an arbitration (module prevented from putting information onto the interconnect is prevented from winning an arbitration).

4. Claims 1, 16, 24, 25, and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Goodrum et al., U.S. Patent 6,032,271.

Referring to claims 1, 16, 24, 25, and 26:

- a. In the Abstract, Goodrum et al. disclose a bus with devices connected to it (an interconnect and a plurality of modules connected to said interconnect for putting packets of information onto the interconnect).
- b. In Figure 15A and the table in column 14, Goodrum et al. disclose that each packet comprises a number of fields containing information including both data and packet routing information, wherein each module has a unique identification on the interconnect and wherein the routing information identifies at least one of the modules associated with the data. Further, throughout Goodrum et al. it is disclosed that the bus is a PCI bus and therefore follows the PCI protocol for placing data on the bus. The packets disclosed in Goodrum et al. are PCI protocol defined.
- c. In column 87, lines 41-50, Goodrum et al. disclose that the bus watcher includes a watch-dog timer to determine whether the secondary bus has locked

Art Unit: 2113

up. If the watch-dog timer expires, then the bus has hung. The following are examples of bus-hang conditions that can be detected by the watch-dog timer. The FRAME_ signal is stuck high or low; the signal TRDY_ is not asserted in response to IRDY_; the PCI arbiter does not grant the bus to nay master; and a master requesting the bus keeps getting retried (circuitry for determining if the information in a packet matches one or more conditions).

d. In column 87, lines 57-64, Goodrum et al. disclose that to isolate the cause of a bus-hang condition, the system error signal SERR_ causes the interrupt logic in the system to issue the NMI to the CPU. The NMIO handler calls a BIOS isolation handler for isolating the defective slot or slots (circuitry for preventing a module from putting further information packets onto said interconnect if it is determined that information on the interconnect matches said one or more conditions).

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al., U.S. Patent 4,486,826 as applied to claim 6 above, and further in view of Cepulis, U.S. Patent 6,055,596.

Referring to claim 4, in column 40, lines 63-68 continued in column 41, lines 1-2, Wolff et al. disclose a so-called broken flip-flop to disable the drivers of a peripheral

Art Unit: 2113

device (module) in order to prevent it from putting further information onto the bus (interconnect). However, Wolff et al. don't explicitly disclose using a register for preventing a module from putting information onto the interconnect. In column 75, lines 3-10, Cepulis discloses that the CPU can power up one of the slots by writing a "1" to a corresponding bit of a slot enable register and disable the slot by writing a "0" to this bit. It would have been obvious to one of ordinary skill at the time of the invention to include the slot enable register of Cepulis into the system of Wolff et al. A person of ordinary skill in the art would have been motivated to make the modification because as disclosed by Wolff et al. a switching means is needed to disconnect a peripheral device. The slot enable register of Cepulis is one type of switching means used to disconnect a peripheral device.

Referring to claim 5, in column 75, lines 3-10, Cepulis discloses that the CPU can power up one of the slots by writing a "1" to a corresponding bit of a slot enable register and disable the slot by writing a "0" to this bit (the register comprises one bit for each module and the value of said bit determines if the respective module is prevented from putting further information into the interconnect).

Referring to claim 6, in column 75, lines 3-10, Cepulis discloses a slot enable register with a corresponding bit for each slot (the location being independent of the address of the module).

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al., U.S. Patent 4,486,826 as applied to claim 13 above, and further in view of Ardini, Jr. et al., U.S. Patent 4,918,693. In column 40, lines 56-68 continued in column 41, lines 1-

Art Unit: 2113

2, Wolff et al. disclose a comparator that compares peripheral (module) output signals (information on interconnect) with corresponding output signals from the check control section (match conditions). In response to an invalid comparison, the comparator switches a so-called broken flip-flop to disable the drivers (determining circuitry using a comparator). However, Wolff et al. don't explicitly disclose satisfying a precondition by having match conditions occurring a predetermined number of times. In column 8, lines 9-14, Ardini, Jr. et al. disclose a diagnostic program that, after a certain number of parity error signals are received from board 202, it will send a code to disable the parity check circuit output. It would have been obvious to one of ordinary skill at the time of the invention to include the parity error signal threshold of Ardini, Jr. et al. into the system of Wolff et al. A person of ordinary skill in the art would have been motivated to make the modification because a parity check circuit can become faulty so that it continuously generates a parity error signal on its output (see Ardini, Jr. et al.: column 8, lines 7-9). In this case, to check for a faulty parity circuit would require a precondition.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al., U.S. Patent 4,486,826 as applied to claim 1 above, and further in view of Pizzica, U.S. Patent 5,652,754. In column 2, lines 48-56, Wolff et al. disclose that the computer system provides fault detection at the level of each functional unit within a processor module. To attain this feature, error detectors monitor hardware operations within each unit and check information transfers between the units (circuitry for determining if said at least part of said information satisfies one or more conditions). However, Wolff et al. don't explicitly disclose storing circuitry to store the information which satisfies the at

Art Unit: 2113

least one condition. In column 2, lines 53-60, Pizzica discloses a signature storage device that stores a fault free signature from a functional digital module and faulty signatures obtained by shorting and opening each of the circuit nodes thereof. It would have been obvious to one of ordinary skill at the time of the invention to include the faulty signature storing of Pizzica into the system of Wolff et al. A person of ordinary skill in the art would have been motivated to make the modification because *the recorded signatures can be used for subsequent pass/fail determination of digital modules that are tested* (see Pizzica: column 1, lines 46-48).

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al., U.S. Patent 4,486,826 as applied to claim 22 above, and further in view of Bershteyn et al., U.S. Patent 5,678,028. In the abstract, Wolff et al. disclose a fault-tolerant computer system comprising a processor unit, a memory unit, one or more peripheral control units, and a bus structure. However, Wolff et al. don't explicitly disclose that these circuits are an integrated circuit. In the Background of Bershteyn et al., a system-on-a-chip debugger is disclosed. It would have been obvious to one of ordinary skill at the time of the invention to make the system of Wolff et al. into the system-on-a-chip debugger of Bershteyn et al. into the. A person of ordinary skill in the art would have been motivated to make the modification because an entire system can be fabricated on a single wafer decreasing the cost of the entire system (see Bershteyn et al.: column 1, lines 45-67).

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al., U.S. Patent 4,486,826, and further in view of Merrill et al., U.S. Patent 4,942,552.

Art Unit: 2113

Referring to claim 26:

a. In column 3, lines 61-64, Wolff et al. disclose that the A and B buses each carry an identical set of cycle-definition, address, data, and parity signals. Further, in column 19, lines 45-49, Wolff et al. disclose a bus protocol for transmitting data on the bus. Therefore the packets of information of Wolff et al. are protocol-defined. However, Wolff et al. don't explicitly disclose having fields/signals that contain information including a source field, a transaction type field, a transaction identifier field, and an operation code field. In column 7, lines 26-30, Merrill et al. disclose that both the read commands and the write commands contain parameters which specify the data to be moved, including the source address, destination address, and the length of data to be moved. In column 19, lines 42-50, Merrill et al. disclose an ID field that contains an operation code which identifies one command message from said predetermined set of command messages. In column 23, lines 22-25, Merrill et al. disclose remote command messages including at least first and second remote command message types. In column 11, lines 18-21, Merrill et al. disclose a transaction number that is included in both the output message and the reply to match up the commands and responses. It would have been obvious to one of ordinary skill at the time of the invention to include the fields of Merrill et al. into the system of Wolff et al. A person of ordinary skill in the art would have been motivated to make the modification because these fields can be used to in comparison to

other signals so as to warn of erroneous information transfer between units (see Wolff et al.: column 3, lines 63-64).

b. In column 2, lines 31-35, Wolff et al. disclose a computer system (a functional circuit), which has a processor module with a processing unit, a random access memory unit, and peripheral control units (plurality of modules), and it has a single bus structure which provides all information transfers between the several units of the module (interconnect for information transfer that is not a circuit-switched bus).

c. In column 2, lines 31-35, Wolff et al. disclose that the computer system has a single bus structure, which provides all information transfers between the several units of the module (circuitry for receiving at least part of said information).

d. In column 14, lines 7-8, Wolff et al. disclose that each data transfer cycle has at least four such timing phases. Further, in column 14, lines 28-68 continued in column 15, lines 1-45, Wolff et al. disclose a definition phase containing address information and a response phase containing data. By definition a packet is a group of bits that perform a function. In Wolff et al. a cycle is a group of bits with different phases that perform a single function. Therefore, Wolff et al. teach a packet containing information including both data and packet routing information. Further, in column 14, lines 45-58, Wolff et al. teach that each module has a unique identification on the interconnect and

Art Unit: 2113

wherein the routing information identifies at least one of the modules associated with the data.

e. In column 2, lines 48-56, Wolff et al. disclose that the computer system provides fault detection at the level of each functional unit within a processor module. To attain this feature, error detectors monitor hardware operations within each unit and check information transfers between the units (circuitry for determining if said at least part of said information satisfies one or more conditions).

f. In column 2, lines 48-56, Wolff et al. disclose that the detection of an error causes the processor module to isolate the bus or unit which caused the error from transferring information to other units (circuitry for performing one or more actions in response to the determination that at least part of the information satisfies one or more conditions).

Response to Arguments

11. Applicant's arguments filed November 17, 2005 have been fully considered but they are not persuasive.

12. On page 7, under the section REMARKS/ARGUMENTS, the Applicant argues that the amendments to claims 1, 16, 24, 25, and 26 differentiate them from the prior art. The Examiner respectfully disagrees. In column 19, lines 45-49, Wolff et al. disclose a bus protocol for transmitting data on the bus. Therefore the packets of information of Wolff et al. are protocol-defined. Also, throughout Goodrum et al. it is

Art Unit: 2113

disclosed that the bus is a PCI bus and therefore follows the PCI protocol for placing data on the bus. The packets disclosed in Goodrum et al. are PCI protocol defined.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Maskulinski whose telephone number is 571-272-3649. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on 571-272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael C Maskulinski
Examiner